

**ABSTRACT OF THE DISCLOSURE:**

[0041] In charge rate estimating apparatus and method for a secondary cell, a current flowing through the secondary cell is measured, a voltage  
5 across terminals of the secondary cell is measured, an adaptive digital filtering is carried out using a cell model in a continuous time series shown in an equation (1), all of parameters at one time are estimated, the parameters corresponding to an open-  
10 circuit voltage which is an offset term of the equation (1) and coefficients of  $A(s)$ ,  $B(s)$ , and  $C(s)$  which are transient terms, and, the charge rate is estimated from a relationship between a previously derived open-circuit voltage  $V_0$  and the charge rate  
15 SOC using the open-circuit voltage  $V_0$ .

$$V = \frac{B(s)}{A(s)} \cdot I + \frac{1}{C(s)} \cdot V_0 \quad \text{--- (1), wherein } s \text{ denotes a}$$

Laplace transform operator,  $A(s)$ ,  $B(s)$ , and  $C(s)$  denote poly-nominal functions of  $s$ .

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